



UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/506,695	09/03/2004	William F. Howard	WEAT/0196 P	4873

7590 01/16/2007
William B Patterson
Moser Patterson & Sheridan
Suite 1500
3040 Post Oak Boulevard
Houston, TX 77056

EXAMINER

BOMAR, THOMAS S

ART UNIT	PAPER NUMBER
----------	--------------

3672

SHORTENED STATUTORY PERIOD OF RESPONSE	MAIL DATE	DELIVERY MODE
3 MONTHS	01/16/2007	PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

If NO period for reply is specified above, the maximum statutory period will apply and will expire 6 MONTHS from the mailing date of this communication.

Office Action Summary

Application No.

10/506,695

Applicant(s)

HOWARD ET AL.

Examiner

Shane Bomar

Art Unit

3672

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 03 September 2004.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-46 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-8, 15, 23-42, 45 and 46 is/are rejected.
- 7) ☒ Claim(s) 9-14, 16-22, 43 and 44 is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☒ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 03 September 2004 is/are: a) ☐ accepted or b) ☒ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____ |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date <u>9/3/04, 11/7/05</u> . | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Drawings

1. The drawings are objected to because the titles of Figures 10A-10D are each missing the abbreviation --Fig.--. Corrected drawing sheets in compliance with 37 CFR 1.121(d) are required in reply to the Office action to avoid abandonment of the application. Any amended replacement drawing sheet should include all of the figures appearing on the immediate prior version of the sheet, even if only one figure is being amended. The figure or figure number of an amended drawing should not be labeled as "amended." If a drawing figure is to be canceled, the appropriate figure must be removed from the replacement sheet, and where necessary, the remaining figures must be renumbered and appropriate changes made to the brief description of the several views of the drawings for consistency. Additional replacement sheets may be necessary to show the renumbering of the remaining figures. Each drawing sheet submitted after the filing date of an application must be labeled in the top margin as either "Replacement Sheet" or "New Sheet" pursuant to 37 CFR 1.121(d). If the changes are not accepted by the examiner, the applicant will be notified and informed of any required corrective action in the next Office action. The objection to the drawings will not be held in abeyance.

Specification

2. The abstract of the disclosure is objected to because of undue length (i.e., more than 150 words). Correction is required. See MPEP § 608.01(b).

Art Unit: 3672

3. The disclosure is objected to because of the following informalities: the Cross-Reference to Related Applications section should be updated to show that the US application is now a US patent.

Appropriate correction is required.

Claim Objections

4. Claims 5, 9, 10, 13, 14, 20, 21, 23, and 33 are objected to because of the following informalities:

- a. in claim 5, line 1, the recitation of “wherein the fluid path” should most likely be changed to --wherein the flow path--;
- b. claim 8 states that the opening is an enlarged area or a pocket, which means that the opening is one or the other, whereas claims 9 and 10 refer to the enlarged area while claims 13, 14, 20, 21, and 23 refer to the pocket; therefore it is unclear whether an enlarged area, a pocket, or both, are being claimed, especially when one compares claims 9 and 14; and
- c. in claim 33, the word “a” should most likely be removed between “adjacent” and “first”.

Appropriate correction is required.

Claim Rejections - 35 USC § 102

5. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

Art Unit: 3672

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

6. Claims 1, 3-8, 15, 23-28, and 33-35 are rejected under 35 U.S.C. 102(b) as being anticipated by US 4,648,455 to Luke.

Regarding claim 1, Luke discloses an apparatus for injecting steam from a wellbore into a geological formation (see Fig. 1 and col. 1, lines 7-10). The apparatus comprises a flow path between a well surface and the formation F1, the flow path including at least one nozzle 16, wherein the at least one nozzle includes a throat portion 16a and a diffuser portion 16b, and whereby the steam will flow through the nozzle at a critical flow rate (see Figs. 3A and 3B and col. 4, lines 37-42).

Regarding claim 3, the apparatus of claim 1 has a critical flow rate that is controlled (see col. 4, lines 37-42).

Regarding claim 4, the apparatus of claim 3 has a flow path that includes a string of tubulars TS extending from the well surface to the formation F1, wherein the nozzle 16 is located in the string TS proximate the formation (see Fig. 1).

Regarding claims 5 and 6, the apparatus of claim 4 further includes perforations P formed in a wall of casing C adjacent the formation F1 (see Fig. 1).

Regarding claims 7 and 8, the apparatus of claim 4 further includes at least one opening 14a that includes an enlarged area 14 formed along the tubulars TS, wherein the nozzle 16 is connected to this opening (see Fig. 3A).

Regarding claim 15, the apparatus of claim 8 further includes a wall 10h between an interior of the tubing and the opening 14a, wherein the wall 10h has at least one aperture 10k formed therein (see Fig. 3A and col. 4, lines 10-13).

Regarding claim 23, the apparatus of claim 8 further includes at least two pockets (seen below CH in Fig. 1) disposed along the string TS and an annular area between each pocket and an adjacent formation is isolated with a packing member PR (see col. 4, lines 34-36).

Regarding claims 24 and 25, the apparatus of claim 8 further includes a nozzle that is remotely removable and insertable (see col. 1, line 67 through col. 2, line 4 and claim 18).

Regarding claim 26, Luke discloses an apparatus for injecting steam at a controlled flow rate into a geological formation (see Fig. 1 and col. 1, lines 7-10). The apparatus comprises a flow path between a well surface and the formation F1, the flow path including at least one nozzle 16, wherein the nozzle is variable to convert steam to a critical flow rate at an annulus/tubing pressure ratio that is inherently up to about 0.9 (see col. 4, lines 37-42). The pressure ratio is inherently up to 0.9 since it was disclosed on page 9 of the applicant's specification that prior art nozzles produce critical flow with annulus/tubing pressure ratios at or below 0.56, which is included in the limitation of "up to about 0.9".

Regarding claim 28, Luke discloses a method of injecting steam into a geological formation that comprises introducing the steam into a wellbore lined with casing C, wherein the wellbore includes at least one zone of interest F1 and the casing C has perforations P adjacent the zone F1, and flowing the steam through a nozzle 16 at a critical flow rate from a string of tubing TS to the perforations P, wherein the nozzle 16 has a throat portion 16a and a diffuser portion 16b (see Figs. 3A and 3B and col. 4, lines 37-42).

Regarding claim 33, Luke discloses an apparatus for injecting steam at a controlled flow rate into multiple zones of interest adjacent a wellbore (see col. 1, lines 7-10). The apparatus comprises a tubular string TS for transporting steam into the wellbore from the surface of the well, and at least two nozzles 16 disposed along the string, wherein each nozzle 16 is adjacent a first F1 and second F2 zone of interest and each nozzle has a throat portion 16a and a diffuser portion 16b (see Figs. 1, 3A, and 3B).

Regarding claim 34, the apparatus of claim 33 further includes a sealing means PR isolating an annular area above and below each nozzle, wherein the annular area is formed between the tubular TS and walls of the wellbore (see Fig. 1).

Regarding claims 27 and 35, the apparatus of claims 26 or 33 further comprises an obstructing member (the upset portion between 10b and 9b in Fig. 3B) downstream of the nozzle that will hinder a portion of the fluid from flowing downstream in the preferential direction.

7. Claims 36-39 are rejected under 35 U.S.C. 102(e) as being anticipated by US 6,318,464 to Mokrys.

Mokrys discloses an apparatus for injecting steam into multiple wellbores 30 from a single source of steam 96, wherein the apparatus comprises a fluid path from the source 96 to each wellbore, and there is at least one nozzle 110 included in each fluid path for controlling a flow of steam using critical flow, the nozzle having a throat and diffuser (see Figs. 1, 2a, and 7; col. 11, lines 1-18).

Claim Rejections - 35 USC § 103

8. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

9. This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

10. Claims 29-32 rejected under 35 U.S.C. 103(a) as being unpatentable over Luke in view of US 5,990,370 to Sims.

Regarding claim 29, Luke teaches a method of injecting steam into a geological formation through a nozzle 16 at a critical flow rate as applied to claim 20 above. It is not taught that the critical flow rate is maintained when the annulus/tubing pressure ratio is greater than 0.56.

Sims teaches a nozzle that can inject steam into a formation and maintain critical flow as long as the pressure ratio is below 0.85 (see col. 3, lines 20-26). At the time the invention was made, it would have been obvious to one of ordinary skill in the art to use the nozzle taught by Sims with the method of injecting steam taught by Luke. One would have been motivated to

Art Unit: 3672

make this combination so that critical flow can be maintained at pressure ratios below 0.85 as taught by Sims.

Regarding claim 30, the combination teaches a method of injecting steam as applied to claim 21, wherein the method further includes introducing the steam at a pressure adequate to overcome the natural pressure and impermeability in the zone of interest (see the abstract and col. 2, lines 14-20 of Luke).

Regarding claim 31, the combination teaches a method of injecting steam as applied to claim 22, wherein the method further includes causing a flow of the steam through the tubing whereby a water component of the steam travels in an annular fashion along an inner wall of the tubing (see col. 4, lines 3-10 of Luke).

Regarding claim 32, the combination teaches a method of injecting steam as applied to claim 23, wherein the method further includes removing the nozzle and inherently replacing it with a second nozzle (see col. 1, line 67 through col. 2, line 4 and claim 18).

11. Claims 40-42 are rejected under 35 U.S.C. 103(a) as being unpatentable over US 4,336,839 to Wagner et al in view of US 5,141,054 to Alameddine et al.

Wagner et al teach an apparatus for injecting steam into a wellbore comprising: a tubular string 47; at least one pocket 46 formed circumferentially around the tubular string; at least one nozzle 18 disposed on the tubular string, the at least one nozzle including a throat portion and a diffuser portion (see Fig. 3); and the apparatus further comprising a plurality of apertures 50 disposed circumferentially around the tubular string to provide fluid communication between the inner diameter 51 of the tubular string and the at least one pocket (see Fig. 5 and col. 4, lines 32-50). However, it is not specifically taught that the wellbore is a lateral wellbore.

Alameddine et al teach an apparatus for injecting steam into a wellbore similar to that of Wagner et al. It is further shown to be notoriously known that steam can be injected into vertical or lateral wellbores (see Figs. 2 and 3; the abstract; and col. 4, lines 1-3). It would have been obvious to one of ordinary skill in the art, having the teachings of Wagner et al and Alameddine et al before him at the time the invention was made, to modify the apparatus taught by Wagner et al to include the ability of injecting into horizontal or vertical wellbores of Alameddine et al, in order to obtain the ability to inject steam into one production interval for the case of a horizontal wellbore, or into multiple intervals for the case of a vertical wellbore. One would have been motivated to make such a combination because the references address the narrow problem of injecting steam into hydrocarbon bearing formations to stimulate production; therefore, a person seeking to solve that exact problem would consult the references and apply their teachings together.

12. Claims 2, 40, 41, 45, and 46 are rejected under 35 U.S.C. 103(a) as being unpatentable over Luke in view of Alameddine et al.

Luke teaches the apparatus of claim 1 where nozzle 16 injects steam into the formation, wherein the at least one nozzle includes a throat portion 16a and a diffuser portion 16b, and further teaches a pocket, defined between the packers PR and the tubular string in Fig. 1, circumferentially surrounding the tubular string, as currently claimed in claims 40 and 41.

Although, it is not specifically taught that the wellbore is a lateral wellbore, the Alameddine et al reference applied to claim 40 immediately above can analogously be applied to Luke with the same reasoning and motivation to show that steam can be injected into lateral or vertical wellbores.

Art Unit: 3672

Regarding claims 45 and 46, the combination teaches that an obstructing member (the upset portion between 10b and 9b in Fig. 3B of Luke) downstream of the nozzle will hinder a portion of the fluid from flowing downstream in the preferential direction.

Allowable Subject Matter

13. Claims 9-14, 16-22, 43, and 44 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

Conclusion

14. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. Claytor teaches a steam injection nozzle 75 attached to tubular 65, wherein the tubular has a pocket 79 circumferentially around it (see Fig. 2).

15. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Shane Bomar whose telephone number is 571-272-7026. The examiner can normally be reached on Monday - Thursday from 6:00am to 2:30pm. The examiner can also be reached on alternate Fridays.


If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, David Bagnell can be reached on 571-272-6999. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Art Unit: 3672

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).



David J. Bagnell
Supervisory Patent Examiner
Art Unit 3672



tsb
January 6, 2007